

We claim:

1. A toy comprising a head and body:

the head having an interior space and a bottom surface with an opening therein in communication with the interior space;

5 an internal pivot pin formed within the interior space;

a lever arm having a distal end and a proximal end, the distal end being pivotally mounted within the head by the internal pivot pin and the proximal end adapted for connection to the body to enable the lever arm to move relative to the body.

10 2. The toy of claim 1 wherein the lever comprises a first material having a first melting point and the internal pivot pin comprises a second material having a second melting point lower than the first melting point.

15 3. The toy of claim 2 wherein the proximal end extends from the opening in the bottom surface of the head.

4. The toy of claim 3 wherein the opening in the bottom surface of the head is a slot accommodating pivotal movement of the lever arm.

20 5. The toy of claim 2 wherein the proximal end of the lever arm is connected to the body.

6. The toy of claim 5 wherein the proximal end of the lever arm is rotatably connected to the body.

7. The toy of claim 6 wherein a rotational member is disposed on the proximal end of the lever arm and the torso comprises an interior space sized and shaped to capture said rotational member so that the head is capable of rotating relative to the body.

8. The toy of claim 1 wherein the rotational member is a disk.

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9. The toy of claim 2 wherein the distal end of the lever arm defines an aperture and the pivot pin engages the aperture to pivotally mount the proximal end of the lever arm within the head.

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10. The toy of claim 2 wherein the head comprises the second material having a melting point lower than the first melting point.

11. The toy of claim 2 wherein the second melting point is at least 30° C lower than the first melting point.

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12. The toy of claim 10 wherein the second material is a thermoplastic material.

13. The toy of claim 10 wherein the first material is selected from the group consisting of nylon, acrylonitrile butadiene styrene, and polyoxymethylene resins, and the second material is selected from the group consisting of PVC and styrene butadiene.

5 14. A method for making a toy figure having a head pivotally connected to a lever arm, the head housing an internal pivot pin and having a bottom surface with an opening therein, the lever arm having a distal end defining an aperture and the internal pivot pin extending through the aperture to pivotally mount the lever arm to the head, the method comprising the steps of:

10 (a) inserting the lever arm into an injection mold having inner walls defining a cavity for forming the head, the lever arm being formed from a material having a given melting point and being positioned in the injection mold so that the distal end is within the cavity; and

15 (b) injecting a sufficient quantity of a first thermoplastic material into the cavity of the mold under injection molding conditions permitting the thermoplastic material to fill the cavity to form the head and to fill the aperture to form the pivot pin, the injecting step being carried out at a temperature that is less than the given melting point of the lever arm.

20 15. A method according to claim 14 wherein the first thermoplastic material has a melting point that is about 30°C to about 200°C less than the given melting point of the pivot pin.

16. A method according to claim 15 wherein the melting point of the first thermoplastic material is about 70°C to about 140°C less than the given melting point of the pivot pin.

5 17. A method according to claim 14 wherein the lever arm material is selected from the group consisting of nylon, acrylonitrile butadiene styrene, and polyoxymethylene resins, and the first thermoplastic material is selected from the group from the group consisting of PVC and styrene butadiene.

10 18. A method according to claim 14 wherein the injection mold is connected to a vertical injection molding apparatus.

19. A method according to claim 14 wherein the lever arm has a proximal end and the lever arm is positioned in the injection mold so that proximal end of the lever arm
15 is outside of the cavity.

20. A method according to claim 19 wherein the opening in the bottom surface of the head is a slot accommodating pivotal movement of the lever arm.

20 21. A method for making an articulating limb comprising a first limb segment, a second limb segment and an elongate member having a first end and a second end, the first limb segment having a distal end connected to the first end of the elongate member

and the second limb member having a proximal end connected to the second end of the elongate member, the method comprising the steps of:

(a) inserting the elongate member into an injection mold having inner walls defining a first cavity for forming the first limb segment and a second cavity for forming the second limb segment, the elongate member being formed from a material having a given melting point and being positioned in the injection mold so that the first end is within the first cavity and the second end is within the second cavity; and

(b) injecting a sufficient quantity of a first thermoplastic material into the first and second cavities of the mold under injection molding conditions permitting the thermoplastic material to fill the first and second cavities and form the first limb segment and the second limb segment, thereby connecting the distal end of the first limb segment to the first end of the elongate member and the proximal end of the second limb member to the second end of the elongate member, wherein the injecting step is carried out at a temperature that is less than the given melting point of the elongate member.

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22. A method according to claim 21 wherein the distal end of the first limb segment is pivotally connected to the first end of the elongate member.

23. A method according to claim 22 wherein the first end of the elongate member defines a first aperture and the distal end of the first limb segment comprises a first pivot pin integrally formed therewith and extending through the first aperture of the elongate member, a sufficient quantity of the first thermoplastic material being injected into the first cavity to fill the first aperture to form the first pivot pin.

24. A method according to claim 21 wherein the distal end of the first limb segment is rotatably connected to the first end of the elongate member.

5 25. A method according to claim 24 wherein the elongate member has a rotational member at its first end and the distal end of the first limb member defines an interior space sized and shaped to capture the rotational member.

26. A method according to claim 25 wherein the rotational member comprises
10 a disk.

27. A method according to claim 21 wherein the first thermoplastic material has a melting point that is about 30°C to about 200°C less than the given melting point of the elongate member.

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28. A method according to claim 27 wherein the melting point of the first thermoplastic material is about 70°C to about 140°C less than the given melting point of the elongate member.

20 29. A method according to claim 26 wherein the elongate member material is selected from the group consisting of nylon, acrylonitrile butadiene styrene, and polyoxymethylene resins, and the first thermoplastic material is selected from the group from the group consisting of PVC and styrene butadiene.

30. A method according to claim 26 wherein the injection mold is connected to a first vertical injection molding apparatus.

5 31. A method according to claim 26 wherein the first vertical injection molding apparatus communicates with the first cavity and a second vertical injection molding apparatus communicates with the second cavity.

32. A method according to claim 21, 22 or 24 wherein the proximal end of the
10 second limb segment is pivotally connected to the second end of the elongate member.

33. A method according to claim 32 wherein the second end of the elongate member defines a second aperture and the proximal end of the second limb segment comprises a second pivot pin integrally formed therewith and extending through the
15 second aperture of the elongate member, a sufficient quantity of the first thermoplastic material being injected into the second cavity to fill the second aperture to form the second pivot pin.

34. A method according to claim 21, 22 or 24 wherein the proximal end of the
20 second limb segment is rotatably connected to the second end of the elongate member.

35. A method according to claim 34 wherein the elongate member has a rotational member at its second end and the proximal end of the second limb member defines an interior space sized and shaped to capture the rotational member.

5 36. A method according to claim 35 wherein the rotational member comprises a disk.

37. A method for making an articulating limb adapted to be connected to a body part, the articulating limb comprising a first limb segment, an elongate member
10 having a first end, and a connecting member having a body-part end adapted to be connected to the body part and a limb end; the first limb segment having a distal end connected to the first end of the elongate member and a proximal end connected to the limb end of the connecting member; the method comprising the steps of:

(a) inserting the elongate member into an injection mold having inner
15 walls defining a first cavity for forming the first limb segment, the first cavity having a distal end and a proximal end and the elongate member being formed from a material having a first melting point and being positioned in the injection mold so that the first end of the elongate member is within the distal end of the first cavity;

(b) inserting the limb end of the connecting member into the injection
20 mold, the connecting member being formed from a material having a second melting point and being positioned in the injection mold so that the limb end is within the proximal end of the first cavity; and

(c) injecting a sufficient quantity of a thermoplastic material into the first cavity of the mold under injection molding conditions permitting the thermoplastic material to fill the first cavity and form the first limb segment, thereby connecting the distal end of the first limb segment to the first end of the elongate member and the proximal end of the first limb segment to the limb end of the connecting member, the
5 injecting step being carried out at a temperature that is less than the lower of the first and second melting points.

38. A method according to claim 37 wherein the distal end of the first limb
10 segment is pivotally connected to the first end of the elongate member.

39. A method according to claim 38 wherein the first end of the elongate member defines a first aperture and the distal end of the first limb segment comprises a first pivot pin integrally formed therewith and extending through the aperture of the
15 elongate member, a sufficient quantity of the first thermoplastic material being injected into the first cavity to fill the first aperture to form the first pivot pin.

40. A method according to claim 37 wherein the distal end of the first limb segment is rotatably connected to the first end of the elongate member.

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41. A method according to claim 40 wherein the elongate member has a rotational member at its first end and the distal end of the first limb member defines an interior space sized and shaped to capture the rotational member.

42. A method according to claim 41 wherein the rotational member comprises a disk.

5 43. A method according to claim 37 wherein the thermoplastic material has a melting point that is about 30°C to about 200°C less than the lower of the first and second melting points.

44. A method according to claim 43 wherein the melting point of the
10 thermoplastic material is about 70°C to about 140°C less than the lower of the first and second melting points.

45. A method according to claim 42 wherein the elongate member material is selected from the group consisting of nylon, acrylonitrile butadiene styrene, and
15 polyoxymethylene resins, and the thermoplastic material is selected from the group from the group consisting of PVC and styrene butadiene.

46. A method according to claim 42 wherein the injection mold is connected to a first vertical injection molding apparatus.

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47. A method according to claim 37, wherein the elongate member has a second end, the articulating limb further comprises a second limb segment connected to the second end of the elongate member, the injection mold has inner walls defining a

second cavity for forming the second limb member, the method further comprising the steps of positioning the elongate member in the injection mold so that the second end of the elongate member is within the second cavity, and injecting a sufficient quantity of the thermoplastic material into the second cavity at a temperature that is less than the lower
5 of the first and second melting points and under injection molding conditions permitting the thermoplastic material to fill the second cavity to form the second limb segment, thereby connecting the second limb segment to the second end of the elongate member.

48. A method according to claim 47 wherein a first vertical injection molding
10 apparatus communicates with the first cavity and a second vertical injection molding apparatus communicates with the second cavity.

49. A method according to claim 38 or 40 wherein the elongate member has a second end, the articulating limb further comprises a second limb segment pivotally
15 connected to the second end of the elongate member, the injection mold has inner walls defining a second cavity for forming the second limb member, the method further comprising the steps of positioning the elongate member in the injection mold so that the second end of the elongate member is within the second cavity, and injecting a sufficient quantity of the thermoplastic material into the second cavity at a temperature that is at
20 least 30°C less than the lower of the first and second melting points and under injection molding conditions permitting the thermoplastic material to fill the second cavity to form the second limb segment, thereby connecting the second limb segment to the second end of the elongate member.

50. A method according to claim 49 wherein the second end of the elongate member defines a second aperture and the second limb segment comprises a pivot pin integrally formed therewith and extending through the second aperture of the elongate member, a sufficient quantity of the first thermoplastic material being injected into the
5 second cavity to fill the second aperture to form the pivot pin of the second limb segment.

51. A method according to claim 40 wherein the elongate member has a second end, the articulating limb further comprises a second limb segment rotatably
10 connected to the second end of the elongate member, the injection mold has inner walls defining a second cavity for forming the second limb member, the method further comprising the steps of positioning the elongate member in the injection mold so that the second end of the elongate member is within the second cavity, and injecting a sufficient quantity of the thermoplastic material into the second cavity at a temperature that is at
15 least 30°C less than the lower of the first and second melting points and under injection molding conditions permitting the thermoplastic material to fill the second cavity to form the second limb segment, thereby connecting the second limb segment to the second end of the elongate member.

20 52. A method according to claim 51 wherein the elongate member has a rotational member at its second end and the proximal end of the second limb member defines an interior space sized and shaped to capture the rotational member.

53. A method according to claim 37 wherein the first melting point is about equal to the second melting point.

54. A method according to claim 37 wherein the limb end of the connecting member is pivotally connected to the proximal end of the first limb segment.

55. A method according to claims 54 wherein the limb end of the connecting member defines an aperture and the proximal end of the first limb segment comprises a pivot pin integrally formed therewith and extending through the aperture of the connecting member, a sufficient quantity of the first thermoplastic material being injected into the first cavity to fill the connecting member aperture to form the pivot pin of the proximal end of the first limb member.

56. A method according to claim 37 wherein the limb end of the connecting member is rotatably connected to the distal end of the first limb segment.

57. A method according to claim 56 wherein the connecting member has a rotational member at its limb end and the distal end of the first limb member defines an interior space sized and shaped to capture the rotational member of the connecting member.

58. A method according to claim 57 wherein the rotational member of the connecting member comprises a disk.

59. A method according to claim 37 wherein the body part end of the connecting member is adapted to be pivotally connected to the body part.

5 60. A method according to claim 59 wherein the body part end of the connecting member defines an aperture.

61. A method according to claim 37 wherein the body part end of the connecting member is adapted to be rotatably connected to the body part.

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62. A method according to claim 61 wherein the body-part end of the connecting member comprises a disk.

63. A toy figure having a trunk comprising:

15 an upper torso member having a reduced-diameter lower end, a middle section and an upper end;

a lower torso member having a substantially circular opening at its upper end for seating the reduced-diameter lower end of said upper torso member; and

a ball joint having a body member and a ball member pivotally and rotatably

20 mounted in the body member, the ball member comprising a shaft extending therefrom, the body member of the ball joint being mounted in the upper torso and being shaped and sized so as to occupy a substantial portion of the interior of the middle section of the upper torso, and the shaft of the ball joint being mounted in the lower torso such that the

upper torso member is seated for pivoting and rotating in the substantially circular opening of the lower torso member.

64. A toy figure having a trunk comprising:

5 an upper torso member having a reduced-diameter lower end;

a lower torso member having an upper end, a lower end, and a substantially circular opening at its upper end for seating the reduced-diameter lower end of said upper torso member; and

a ball joint having a body member and a ball member pivotally and rotatably
10 mounted in the body member, the ball member comprising a shaft extending therefrom, the body member of the ball joint being mounted in the lower torso and being shaped and sized so as to occupy a substantial portion of the upper end of the lower torso, and the shaft of the ball joint being mounted in the upper torso such that the upper torso member is seated for pivoting and rotating in the substantially circular opening of the lower torso
15 member.

65. A toy figure comprising:

a trunk;

a shaft member connected to the trunk and having a first end projecting
20 from the trunk, the first end comprising a first substantially spherical ball member; and

a first limb member having a proximal end defining a cavity for capturing the first spherical ball member to rotationally connect the first limb member to the shaft

member, the proximal end of the first limb member further defining an arcuate opening to accommodate pivotal movement of the shaft member relative to the first limb member.

66. The toy figure of claim 65 wherein the shaft member has a second end
5 projecting from the trunk and comprising a second substantially spherical ball member,
the toy figure further comprising a second limb member having a proximal end defining a
cavity for capturing the second spherical ball member to rotationally connect the second
limb member to the shaft member, the proximal end of the second limb member further
defining an arcuate opening to accommodate pivotal movement of the shaft member
10 relative to the second limb member.

67. The toy figure of claim 65 wherein the proximal end of first limb member
comprises a pair of complimentary shells.

15 68. The toy figure of claim 65 wherein the trunk defines a cavity and a portion
of the shaft member between the first end and the second end sits in the cavity defined by
the trunk.

69. The toy figure of claim 68 wherein the portion of the shaft member
20 between the first end and the second end comprises a projection and the cavity defined by
the trunk captures the projection.

70. An articulating limb of a toy figure, the articulating limb being rotatable at two spaced-apart locations along a single member and comprising:

an elongate member having a first end comprising a first rotational member and a second end comprising a second rotational member;

5 a first limb segment having a distal end defining an interior space sized and shaped to capture the first rotational member; and

a second limb segment having a proximal end defining an interior space sized and shaped to capture the second rotational member.

10 71. The articulating limb of claim 70 wherein the first rotational member comprises a disk.

72. The articulating limb of claim 71 wherein the second rotational member comprises a disk.

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73. An articulating limb of a toy figure, the articulating limb being rotatable at one of two spaced-apart locations along a single member and pivotable at the other of the two spaced-apart locations, the articulating limb comprising:

an elongate member having a first end comprising a rotational member and a
20 second end defining an aperture;

a first limb segment having an end defining an interior space sized and shaped to capture the rotational member; and

a second limb segment having an internal pivot pin formed within the second limb segment and adapted to engage the aperture.

74. The articulating limb of claim 73 wherein the rotational member
5 comprises a disk.